

Evaluation for yield of traditional upland rice cultivars of Orissa

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ABSTRACT

Eleven traditional early duration varieties of rice, collected from four tribal dominated hilly districts of Orissa, were compared with the high yielding improved check in respect of yield and nine component characters. Among the traditional cultivars, Chheligudia produced highest grain yield of 429 gm⁻² that was at par with that of the high yielding improved check variety Swarnaprabha. Significant variation was observed for leaf area index, specific leaf weight, tillers m⁻², total dry matter at flowering stage and panicles m⁻², spikelets m⁻², 1000-grain weight and yield at harvest.

Key words: : rice, rain fed, upland, yield, Orissa

Collection of germplasm and assessment of genetic diversity are the important steps for initiating genetic improvement of any crop. Identification of promising genotypes especially, suiting to drought prone regions is a major threat that confronts the rice research workers world over. In India, rain fed upland rice accounts for 6.00 million hectares, which is 13.5% of the total rice area in the country, of which 0.7 million ha is grown in Orissa under rainfed condition. In these rain fed uplands mostly traditional early varieties are grown. The yield of these early duration cultivars are quite low as they are subjected to moisture stress during different stages of crop growth. Selection of suitable local varieties having better productive efficiency would help boosting rice production in these areas. The importance of short duration early varieties of rice for rain fed upland and irrigated land has been emphasized (Rao *et al.*, 1971, Chaudhary and Rao, 1982 and Maurya and Chaudhary, 1985). Keeping this in view, a total of eleven traditional rice varieties collected from four tribal districts of Orissa viz. Mayurbhanj, Keonjhar, Kandhamal and Bolangir were selected from the rice genetic stock of the NBPGR Base centre, Cuttack and were grown along with one high yielding check Swarnaprabha in the experimental farm of Central Rice Research Institute, Cuttack.

Twenty one-day old seedlings were transplanted in randomized block design with 15X10 cm spacing and fertilizer application @ 60:30:30 kg ha⁻¹ of N, P₂O₅ and K₂O, respectively. Ten randomly selected plants at flowering and 66 plants (from 1m² land area) at harvest stage were taken from each of the replications to record observations on growth parameters like tiller number, leaf area index, specific leaf weight, total dry matter at flowering and yield attributes like panicle number, number of spikelets panicle⁻¹, 1000-grain weight, sterility % and grain yield. The significant differences among the cultivars in respect of each of the 9 component characters were compared through LSD test. The simple correlation of each component character with the yield was also worked out.

Among the eleven local cultivars, significantly higher number of tillers were observed in Nikima. Similarly, the ear-bearing tiller was significantly higher in the variety Nikima than the check Swarnaprabha as well as Saria, Kendka, Chheligudia and Alsanga (Table 1). However, the grain yield was recorded highest in check Swarnaprabha (466 gm⁻²) followed by Chheligudia (429 gm⁻²) and Nalisaria (391gm⁻²). The total dry matter at harvest was the highest in Swarnaprabha followed by Nalisaria, Bada basmati and

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Table 1. Relative performance of traditional rice cultivars for growth and yield parameters.

Variety	Component Characters								
	Tiller no.m ⁻²	LAI	SLW mgdm ⁻²	TDM gm ⁻²	Panicle nom ⁻²	Spikelite nopan ⁻¹	1000-gr wt. (g)	TDM gm ⁻²	Yield gm ⁻²
Nalisaria	356c	2.21ef	453f	466de	258a	62.4b	24.3ef	857f	391de
Alsanga	458d	1.94bcde	427de	433de	387cd	53.9b	22.0d	769e	389de
Saria-gudadhan	253a	1.58ab	403bcd	328ab	254a	81.9d	16.0a	544a	268a
Pandkoya	325b	1.75abcd	392bc	342b	333bc	36.6a	29.7h	560a	294ab
Bhurusakunda	347b	2.21ef	371ab	374bc	371cd	61.6b	17.7b	608abc	317abc
Sathi	307b	1.53a	390bc	284a	342bc	56.9b	20.4c	646bc	342bcd
Badabasmasti	378c	2.43fg	427de	566f	298ab	65.9bc	21.0c	842ef	370cde
Nikima	644e	2.72g	356a	410cd	522e	28.6a	22.0d	570ab	289ab
Chheligudia	427d	1.99cde	430def	481e	350bcd	66.3bcd	22.4d	805ef	429ef
Lendka	418d	3.33h	408cd	609f	420d	35.4a	25.0fg	664c	303ab
Saria	480d	2.07def	461f	455de	393cd	33.5a	23.9e	556a	267a
Swarnaprabha	438d	1.67abc	444ef	361bc	358bcd	78.3cd	25.6g	963g	466f
Correlation with yield	0.03	-0.15	0.35*	0.09	-0.15	0.53**	0.17	0.84**	

Figures in a column super scribed by the same letter do not differ significantly by DMRT at p= 0.05

** & * significant at p=0.01 and p=0.05 respectively

LAI= Leaf area index, SLW= Specific leaf weight, TDM= Total dry matter

Chheligudia. The higher values of total dry matter (TDM) at harvest accompanied by high specific leaf weight (SLW) at flowering, ear bearing tiller, spikelet number and 1000-grain weight might have contributed to higher yields in Swarnaprabha, Chheligudia and Nalisaria as these component characters (SLW, TDM, spikelets panicle⁻²) of yield have shown significant correlations with yield. Mohanty *et al.*, (1989) suggested intensifying more selection pressure on plant height, 100-grain weight and grain yield while selecting very early rice genotypes. Thus the traditional cultivars, Chheligudia and Nalisaria were identified as promising which are comparable with the high yielding check Swarnaprabha of similar duration and hence their cultivation might give encouraging yields, especially in areas for rainfed uplands where high yielding varieties are not yet popular or not accepted by the farmers owing to the local preference for traditional varieties.

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